REMARKS

Claims 1-27 are pending in the application, with claim 15 being allowed. Claims 1-14 and 16-27 stand rejected.

Claim Objections

Claim 12 is objected to because of minor informalities. Taking the Examiner's comments into consideration, claim 12 has been amended. Therefore, withdrawal of the objection to claim 12 is respectfully requested.

Claim Rejections under 35 USC §103

Claims 1-4 and 26 are rejected under 35 USC §103(a) as being unpatentable over Takehara et al. (U.S. Patent No. 5,669,987) in view of Takeda (U.S. Patent No. 5,594,313) and Asaoka (Japanese Patent Publication No. 2000022192 to Mitsubishi, English Translation).

The present invention is a diagnostic method and device for a photovoltaic power system. Reference output characteristics are stored in the system based upon installation conditions or based upon past output characteristics. These reference output characteristics are then compared against output characteristics measured during the operation of the system. If the output characteristic falls below a lower limit diagnosis factor or above an upper limit

diagnosis factor then an abnormality is detected.

Takehara et al. describes a device and method for detecting an abnormality in a solar cell array. This device and method monitors electrical parameters of a solar cell, solar cell strings or sub-arrays. If the solar cell, the solar cell string or sub-array exhibits a relatively low output then an abnormality is determined and a warning is issued. In addition, if the solar cell, solar cell string or sub-array exhibits a large variation ratio then an abnormality is determined and a warning is issued.

Takeda describes a solar cell system that stores electric power generated by solar cells and supplies the electric power to a load. This system includes a solar cell assembly having a capacity for generating electric power in a quantity consumed by the load in one day, a quantity being determined from an estimated quantity of solar radiation available on a rainy or cloudy day. This estimate uses a correction factor that embraces temperature changes of solar cells output occurring throughout the year.

Asaoka describes a snow accumulation detector for solar cells that operates at night. This snow accumulation detector operates using a strobe light that illuminates the solar cells at night. The accumulated snow evaluation circuit (21) then compares a predetermined voltage taken earlier with a voltage taken during the test. Based upon this comparison and a determination is made whether snow has accumulated on the solar cells.

The prior art of record fails to describe that "the photovoltaic power system is diagnosed as normal if the following condition is satisfied, a base value (b) times a correction factor (v) times a lower limit diagnosis factor (r) is less than an actual measured value which is less than the base value (b) times the correction factor (v) times an upper limit diagnosis factor (s)". Therefore, claim 1 patentably distinguishes over the prior art of record by reciting,

> "A method for diagnosing the normality/abnormality of an output of an installed photovoltaic power system, comprising the steps of: comparing a reference output characteristic obtained chronologically in accordance with an installation condition of said photovoltaic power system with a measured output characteristic in said photovoltaic power system obtained during operation of the photovoltaic power system itself, said installation condition includes a topography of an installation site, meteorological conditions and configuration of the photovoltaic power system, and diagnosing the normality/abnormality of the output of said photovoltaic power system based on the comparison result, wherein said photovoltaic power system in diagnosed as normal only if said measured output characteristic is greater than a first predetermined value and less than a second predetermined value, said first and second predetermined values being based on said reference output characteristic, wherein comparisons of the reference output characteristic and the measured output characteristic are performed at different time points of a day, wherein said photovoltaic power system is diagnosed as normal if the following condition is satisfied, a base value (b) times a correction factor (v) times a lower limit diagnosis factor (r) is less than an actual measured value which is less than the base value (b) times the correction factor (v) times an upper limit diagnosis factor (s)." (Emphasis Added)

Therefore, withdrawal of the rejection of Claims 1-4 and 26 under 35 USC §103(a) as being unpatentable over Takehara et al. (U.S. Patent No. 5,669,987) in view of Takeda (U.S. Patent No. 5,594,313) and Asaoka (Japanese Patent Publication No. 2000022192 to Mitsubishi, English Translation) is respectfully requested.

Claims 5, 7-10, 13, 14, 16, 17, 19, 20, 22, 23, 25 and 27 are rejected under 35 USC §103(a) as being unpatentable over Takehara et al. in view of Asaoka (Japanese Patent Publication No. 2000022192 to Mitsubishi, English Translation).

The prior art of record fails to describe that "the photovoltaic power system is diagnosed as normal if the following condition is satisfied, a base value (b) times a correction factor (v) times a lower limit diagnosis factor (r) is less than an actual measured value which is less than the base value (b) times the correction factor (v) times an upper limit diagnosis factor (s)". Therefore, claims 5,9, 10, 16, 19, 22 and 25 patentably distinguish over the prior art of record by reciting, as exemplified by claim 5,

> "A method for diagnosing the normality/abnormality of an output of an installed photovoltaic power system, comprising the steps of: calculating a reference output characteristic chronologically at the time of normal operation of the photovoltaic power system itself in accordance with an installation condition of said photovoltaic power system; measuring an output characteristic chronologically in said photovoltaic power system obtained during operation of the photovoltaic power system itself; comparing the calculated reference output characteristic chronologically with the measured output characteristic; and diagnosing the normality/abnormality of the output of said photovoltaic power system based on the comparison result, wherein comparisons of the reference output characteristic and the measured output characteristic are performed at different time points of a day, wherein said photovoltaic power system is diagnosed as normal if the following condition is satisfied, a base value (b) times a correction factor (v) times a lower limit diagnosis factor (r) is less than an actual measured value which is less than the base value (b) times the correction factor (v) times an upper limit diagnosis factor (s)." (Emphasis Added)

Therefore, withdrawal of the rejection of Claims 5, 7-10, 13, 14, 16, 17, 19, 20, 22, 23, 25 and 27 under 35 USC §103(a) as being unpatentable over Takehara et al. in view of Asaoka (Japanese Patent Publication No. 2000022192 to Mitsubishi, English Translation) is respectfully requested.

Claim 12 is rejected under 35 USC §103(a) as being unpatentable over Takehara et al. in view of Asaoka, and further in view of Eryurek et al. (U.S. Patent No. 6,119,047).

Claim 12 is allowable by virtue of its dependence from an allowable independent claim. Therefore, withdrawal of the rejection of Claim 12 under 35 USC §103(a) as being unpatentable over Takehara et al. in view of Asaoka, and further in view of Eryurek et al. (U.S. Patent No. 6,119,047) is respectfully requested.

Claims 6, 11, 18, 21 and 24 are rejected under 35 USC §103(a) as being unpatentable over Takehara et al. in view of Asaoka, and further in view of Takeda.

Claims 6, 11, 18, 21 and 24 are allowable by virtue of their dependence from an allowable independent claim. Therefore, withdrawal of the rejection of Claims 6, 11, 18, 21 and 24 under 35 USC §103(a) as being unpatentable over Takehara et al. in view of Asaoka, and further in view of Takeda is respectfully requested.

Conclusion

In view of the aforementioned amendments and accompanying remarks, Applicants believe this application is now in allowable condition. Early action toward allowance thereof is respectfully requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,
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